

### **REMARKS**

Claims 1-16, 19-35, 43 and 45-55 are pending in the present application. By this Amendment, previously presented claims 1, 3, 23-24, 43, 45, 51 and 53 have been amended, and previously presented claims 17-18 have been canceled. Applicants respectfully request reconsideration of the present claims in view of the foregoing amendment and the following remarks.

As shown in the above amendments, (1) previously presented dependent claim 3 has been rewritten in independent form by incorporating the subject matter of previously presented independent claim 1 into dependent claim 3; (2) the subject matter of previously presented dependent claims 17 and 18 (now canceled) has been incorporated into previously presented independent claim 1; (3) the dependency of previously presented dependent claim 53 has been changed from canceled claim 17 to currently amended independent claim 1; (4) previously presented independent claim 45 has been amended to more precisely describe the detection layer and to incorporate the language of “objected to” claim 15 into part “(d)” of claim 45; and (5) previously presented claims 1, 23-24, 43, 45, 51 and 53 have been amended to change “said analyte” to “the analyte.”

Entry of the above amendments are proper under 37 C.F.R. § 1.116 (a) in that the above amendments (1) place the claims in condition for allowance; (2) place the claims in better condition for consideration on appeal, if necessary; (3) do not raise any new issues; and (4) do not add new claims without canceling a corresponding number of claims. For the reasons given above, entry of the above amendments under 37 C.F.R. § 1.116 is respectfully requested.

#### I. Formal Matters:

##### Allowable Subject Matter

Applicants note with appreciation that previously presented claims 43 and 55 are allowable. Applicants further note with appreciation that previously presented claims 5, 11-16, 21, 31, 33 and 47 are objected to as being dependent upon a rejected base claim and would be allowable if rewritten in independent form.

For at least the reasons provided below, Applicants respectfully submit that all of claims 1-16, 19-35, 43 and 45-55 are allowable over the art of record. Accordingly, allowance of

all of claims 1-16, 19-35, 43 and 45-55 is respectfully requested.

June 17, 2008 Telephone Interview

Applicants and Applicants' representative thank Examiner Akram and SPE Neckel for discussing the April 18, 2008 final Office Action during a June 17, 2008 telephone interview. As discussed during the telephone interview, the present invention is directed to sensors that differ structurally from the sensors of the prior art.

As further discussed during the telephone interview, Applicants have amended the claims as shown above to focus the claims on particular embodiments of Applicants' disclosed invention.

For at least the reasons discussed during the June 17, 2008 telephone interview and the reasons provided below, Applicants respectfully request consideration and allowance of claims 1-16, 19-35, 43 and 45-55.

Consideration of Previously Submitted Information Disclosure Statements

Applicants acknowledge with appreciation that the previously submitted November 16, 2007 Information Disclosure Statement has been considered in the present application.

II. Prior Art Rejections:

Rejection of Previously Presented Claims 1-4, 7-10, 17-20, 22-28, 34, 45 and 48-53 Under 35 U.S.C. §102(e) In View Of Drewes

Previously presented claims 1-4, 7-10, 17-20, 22-28, 34, 45 and 48-53 were rejected under 35 U.S.C. §102(b) as being anticipated by Drewes. This rejection is respectfully traversed.

In order for the disclosure of Drewes to anticipate Applicants' claimed invention, the disclosure of Drewes must disclose each and every claim feature. *See, Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). *See also, Finnigan Corp. v. International Trade Commission*, 180 F.3d 1354, 1365, 51 USPQ2d

1001, 1009 (Fed. Cir. 1999) in which the Court states “In order to establish anticipation, a prior art reference must disclose every feature of the claimed invention.”

As discussed during the June 17, 2008 telephone interview, the disclosure of Drewes fails to disclose, teach, or suggest Applicants’ claimed invention as embodied in previously presented claims 1-4, 7-10, 17-20, 22-28, 34, 45 and 48-53. In particular, the disclosure of Drewes fails to disclose, teach, or suggest at least the following claim features recited in independent claims 1 and 45:

(1) a colorimetric sensor comprising (i) a reflective layer, (ii) a detection layer over the reflective layer, and (iii) a semi-reflective layer over the detection layer, wherein the detection layer is capable of a change in optical thickness upon exposure to the analyte (claims 1 and 45);

(2) a colorimetric sensor comprising (i) a reflective layer, (ii) a detection layer over the reflective layer, the detection layer comprising at least one polymer component, and (iii) a semi-reflective layer over the detection layer, the semi-reflective layer having an index of refraction different from the index of refraction of the detection layer (claim 1);

(3) a colorimetric sensor comprising a detection layer comprising a porous detection layer comprising at least one polymer having an intrinsic microporosity (claim 1);

(4) a colorimetric sensor comprising (i) a reflective layer, (ii) a detection layer over the reflective layer, the detection layer being capable of a change in optical thickness upon exposure to the analyte, and (iii) a discontinuous semi-reflective layer over the detection layer (claim 45);

(5) a colorimetric sensor comprising (i) a reflective layer, (ii) a detection layer over the reflective layer, the detection layer being capable of a change in optical thickness upon exposure to the analyte, and (iii) a discontinuous semi-reflective layer over the detection layer, wherein the discontinuous semi-reflective layer comprises a single layer of semi-reflective islands having at least one dimension greater than 10  $\mu\text{m}$ , and exposed areas between the semi-reflective islands, said exposed areas having a width of at least 1.0  $\mu\text{m}$  (claim 45);

(6) a colorimetric sensor comprising (i) a reflective layer, (ii) a detection layer over the reflective layer, the detection layer being capable of a change in optical thickness upon exposure to the analyte, and (iii) a discontinuous semi-reflective layer over the detection layer,

wherein the discontinuous semi-reflective layer comprises a single layer of semi-reflective islands and the detection layer contains wells extending a depth into the detection layer (claim 45);

(7) a colorimetric sensor comprising (i) a reflective layer, (ii) a detection layer over the reflective layer, the detection layer being capable of a change in optical thickness upon exposure to the analyte, and (iii) a discontinuous semi-reflective layer over the detection layer, wherein the discontinuous semi-reflective layer comprises a single layer of semi-reflective islands and the detection layer comprises at least one inorganic component either alone or in combination with the at least one polymer component (claim 45);

(8) a colorimetric sensor comprising (i) a reflective layer, (ii) a detection layer over the reflective layer, the detection layer being capable of a change in optical thickness upon exposure to the analyte, and (iii) a discontinuous semi-reflective layer over the detection layer, wherein the detection layer comprises a single layer of semi-reflective islands and the detection layer comprises at least one inorganic component, wherein the at least one inorganic component is (1) blended with the at least one polymer component, (2) within a given layer containing the at least one polymer component but not blended with the at least one polymer component, (3) in a layer separate from a layer containing the at least one polymer component, or (4) any combination of (1) to (3) (claim 45); and

(9) a colorimetric sensor comprising (i) a reflective layer, (ii) a detection layer over the reflective layer, the detection layer being capable of a change in optical thickness upon exposure to the analyte, and (iii) a discontinuous semi-reflective layer over the detection layer, wherein the detection layer comprises at least two different polymeric components, wherein the polymeric components are (1) blended with one another, (2) within a given layer but not blended with one another, (3) in a layer separate from one another, or (4) any combination of (1) to (3) (claim 45).

Since the disclosure of Drewes fails to disclose each and every claim feature recited in Applicants' independent claims 1 and 45, the disclosure of Drewes cannot anticipate independent claims 1 and 45. Since claims 2-4, 9-10, 19-20, 22-28, 34, 48-50 and 52-53 depend from independent claim 1 and recite additional claim features (previously presented claims 17-18

have been canceled), the disclosure of Drewes cannot anticipate dependent claims 2-4, 9-10, 19-20, 22-28, 34, 48-50 and 52-53.

Further, since previously presented claim 3, now independent claim 3, contains the above-noted claim features of previously presented claim 1 in combination with the claim features of previously presented claim 3 (e.g., a substantially continuous semi-reflective layer), the disclosure of Drewes also fails to anticipate independent claim 3, as well as claims 5, 7-8 and 51, which depend from independent claim 3 and recite additional claim features.

As discussed during the Jun 17, 2008 telephone interview, the disclosure of Drewes does not disclose, teach or suggest a detection layer comprising at least one polymer positioned between an outer reflective layer and an outer semi-reflective layer as recited in independent claim 1. The only polymer-containing layers disclosed in the teaching of Drewes are (1) the support layer and (2) the attachment layer. See, for example, Drewes, column 12, lines 11-17 (possible support layer materials) and column 15, lines 1-3 (possible attachment layer materials). There is no suggestion in Drewes of sandwiching either of these layers between an outer reflective layer and an outer semi-reflective layer as recited in independent claim 1.

In addition, as discussed during the Jun 17, 2008 telephone interview, the disclosure of Drewes does not disclose, teach or suggest a detection layer comprising a porous detection layer comprising at least one polymer having an intrinsic microporosity as recited in new independent claim 1.

Regarding independent claim 45, the Office Action states the following at page 6, lines 1-19:

Regarding claim 45, Drewes discloses a colorimetric sensor for measuring one or both of the presence and concentration of an analyte, said colorimetric sensor comprising: a reflective layer (the support layer of column 12, lines 45-50); a detection layer over the reflective layer (the Optically Functional layer of column 13, lines 53-62), the detection layer comprising at least one polymer component (column 15, lines 2-17), said detection layer being capable of a change in optical thickness upon exposure to said analyte (column 14, lines 39-47); and a semi-reflective layer over the detection layer, the semi-reflective layer having an index of refraction different from the index of refraction of the detection layer (see attachment layer of column 15, lines 42-67), wherein at least a portion of the semi-reflective layer is permeable to said analyte (see claim 1) as is the reflective layer (column 12,

lines 22-38). Examiner makes an argument of inherency for reflective, semi-reflective, and refractive index properties for the different embodiments of reference invention. Drewes discloses that the detection layer further comprises an inorganic material (column 13, lines 53-62), said inorganic material being within a given layer containing the at least one polymer component or in a layer separate from the at least one polymer component (column 15, lines 2-17). Drewes discloses that the detection layer comprises two or more polymer components (column 15, lines 2-17) and wherein the optical thickness of each polymer component changes in the presence of a different analyte (column 14, lines 21-25).

Applicants respectfully note that the claimed sensor of independent claim 45 does not require or recite “at least one polymer component” as suggested in the above-referenced portion of the April 18, 2008 final Office Action.

Further, Applicants note that the above-referenced portion of the April 18, 2008 final Office Action suggests that (1) the support layer of Drewes’ sensors can be considered to be the reflective layer as recited in claim 45, (2) the optically functional layer of Drewes’ sensors can be considered to be the detection layer as recited in claim 45, and (3) the attachment layer of Drewes’ sensors can be considered to be the semi-reflective layer as recited in claim 45. However, even if the above-noted portions of Drewes were given the interpretation as provided in the April 18, 2008 final Office Action, the above-referenced sensor of Drewes does not disclose, teach or suggest (1) a detection layer sandwiched between a reflective layer and a semi-reflective layer, wherein the detection layer is capable of a change in optical thickness upon exposure to an analyte, (2) a discontinuous attachment layer comprising a single layer of semi-reflective islands, or (3) a discontinuous attachment layer in combination with a detection layer comprising at least two different polymeric components as recited in claim 45. Given that above-noted missing claim features recited in Applicants’ claim 45, the above-referenced sensor of Drewes fails to anticipate claim 45.

Rejection of Previously Presented Claim 6 Under 35 U.S.C. §103(a) In View of Drewes and further in view of U.S. Patent No. 5,124,172 (Burrell)

Previously presented claim 6 was rejected under 35 U.S.C. §103(a) as being unpatentable in view of Drewes, and further in view of U.S. Patent No. 5,124,172 issued to

Burrell et al. (hereinafter “Burrell”). This rejection is respectfully traversed.

Previously presented claim 6 depends from independent claim 1, and further recites that the claimed detection layer comprises a pattern of wells beneath a lower surface of the semi-reflective layer and extending a depth into the detection layer.

The teaching of Drewes fails to make obvious Applicants’ claimed invention as embodied in dependent claim 6 for at least the reasons given above. In particular, the teaching of Drewes fails to disclose, teach or suggest the following claim features of independent claim 1:

(1) a colorimetric sensor comprising (i) a reflective layer, (ii) a detection layer over the reflective layer, the detection layer comprising at least one polymer component, and (iii) a semi-reflective layer over the detection layer, the semi-reflective layer having an index of refraction different from the index of refraction of the detection layer; and

(2) a colorimetric sensor comprising a detection layer comprising a porous detection layer comprising at least one polymer having an intrinsic microporosity.

The teaching of Burrell is directed to a thin film diagnostic device comprising (i) a thin sputtered layer 12 of tantalum on a substrate 11 (c.g., glass), (ii) a barrier layer 15 of tantalum oxide on sputtered layer 12, (iii) a porous anodized aluminum oxide-containing layer 14 on the barrier layer 15, and (iv) a coating 17 of reagent material on porous anodized aluminum oxide-containing layer 14. See, FIGS. 1-5. Suitable reagents include either member of a pair of molecules that selectively bind to one another to form a complex. Exemplary pairs are disclosed in column 5, lines 4-20.

Regarding the rejection of Applicants’ previously presented claim 6, the April 18, 2008 Office Action states the following on page 8, line 19 to page 9, line 3:

Drewes does not disclose a pattern of wells beneath a surface of the semi-reflective layer and extending a depth into the detection layer. Burrell, however, discloses a detection layer with wells (see figure 3). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include wells in the detection layer because Burrell discloses this feature as a known method to increase surface area for the analytes to be tested. The claim would have been obvious because the technique for improving a particular class of devices was part of the ordinary capabilities of a person of ordinary skill in the art, in view of the teaching of the technique for improvement in other situations.

Applicants disagree.

Like the teachings of Drewes, the teaching of Burrell fail to disclose, teach or suggest a polymer-containing detection layer containing wells, wherein the polymer-containing detection layer containing wells is beneath a lower surface of a semi-reflective layer as recited in claim 6. Further, like the teachings of Drewes, the teaching of Burrell fail to disclose, teach or suggest a detection layer comprising at least one polymer having an intrinsic microporosity as recited in independent claim 1. Consequently, even if the proposed combination of the teaching of Drewes with the teaching of Burrell is deemed proper, the proposed combination of the teaching of Drewes with the teaching of Burrell still fails to teach or suggest Applicants' claimed invention as embodied in claim 6.

For at least the reasons given above, it is respectfully submitted that the proposed combination of the teaching of Drewes with the teaching of Burrell fails to make obvious Applicants' claimed invention as embodied in dependent claim 6. Accordingly, withdrawal of this rejection is respectfully requested.

Rejection of Previously Presented Claims 29-30, 46 and 54 Under 35 U.S.C. §103(a) In View of Drewes and further in view of U.S. Patent Application Publication No. 2003/0207454 (Eyster)

Previously presented claims 29-30, 46 and 54 were rejected under 35 U.S.C. §103(a) as being unpatentable in view of Drewes, and further in view of U.S. Patent Application Publication No. 2003/0207454 to Eyster et al. (hereinafter "Eyster"). This rejection is respectfully traversed.

Previously presented claims 29-30 and 54 depend from independent claim 1, and further recite an array comprising the sensor of claim 1. Previously presented claim 46 depends from independent claim 45, and further recites an array comprising the sensor of claim 45.

As discussed above, the teaching of Drewes fails to disclose, teach or suggest a colorimetric sensor comprising (i) a reflective layer, (ii) a detection layer over the reflective layer, the detection layer comprising at least one polymer component, and (iii) a semi-reflective layer over the detection layer as recited in each of independent claims 1 and 45.



The teaching of Eyster is directed to devices for determining the concentration of an analyte in a physiological sample. Like the teaching of Drewes, the teaching of Eyster fails to disclose, teach or suggest a colorimetric sensor comprising (i) a reflective layer, (ii) a detection layer over the reflective layer, the detection layer comprising at least one polymer component, and (iii) a semi-reflective layer over the detection layer as recited in each of independent claims 1 and 45

Even if the proposed combination of the teaching of Drewes with the teaching of Eyster is deemed proper, the proposed combination of the teaching of Drewes with the teaching of Eyster still fails to teach or suggest Applicants' claimed invention as embodied in claims 29-30, 46 and 54. In particular, the proposed combination of the teaching of Drewes with the teaching of Eyster still fails to teach or suggest (1) a polymer-containing detection layer sandwiched between a reflective layer and a semi-reflective layer as recited in Applicants' independent claims 1 and 45, and (2) a detection layer comprising a polymer of intrinsic microporosity as recited in Applicants' independent claim 1.

For at least the reasons given above, it is respectfully submitted that the proposed combination of the teaching of Drewes with the teaching of Eyster fails to make obvious Applicants' claimed invention as embodied in dependent claims 29-30, 46 and 54. Accordingly, withdrawal of this rejection is respectfully requested.

Rejection of Previously Presented Claim 32 Under 35 U.S.C. §103(a) In View of Drewes and U.S. Patent No. 5,869,272 (Bogart)

Previously presented claim 32 was rejected under 35 U.S.C. §103(a) as being unpatentable in view of Drewes in combination with U.S. Patent No. 5,869,272 issued to Bogart et al. (hereinafter "Bogart"). This rejection is respectfully traversed.

Previously presented claim 32 depends from independent claim 1, and further recites a device comprising the colorimetric sensor of claim 1, and a housing at least partially enclosing the colorimetric sensor, wherein the housing comprises at least one opening positioned above the semi-reflective layer, said at least one opening providing a restricted view of an upper surface of the semi-reflective layer.

As discussed above, the teaching of Drewes fails to disclose, teach or suggest multiple claim features of independent claim 1.

The teaching of Bogart is directed to specific analyte-detection devices having an optically active surface. Exposure of the optically active surface of the device to an analyte provides a visual color change. Referring to FIGS. 6A-6F, the disclosed devices of Bogart comprise (i) a base substrate layer (1), (ii) an optional metal film layer (6) on base substrate layer (1), (iii) an optional amorphous silicon layer (5) on base substrate layer (1) or metal film layer (6), (iv) an optional optical thin film (2) on base substrate layer (1) or amorphous silicon layer (5), (v) an attachment layer (3) on base substrate layer (1) or amorphous silicon layer (5) or optical thin film (2), and (vi) a receptive material layer (4) on attachment layer (3).

Like the teaching of Drewes, the teaching of Bogart fails to disclose, teach or suggest a colorimetric sensor comprising (i) a reflective layer, (ii) a detection layer over the reflective layer, the detection layer comprising at least one polymer component, and (iii) a semi-reflective layer over the detection layer as recited in independent claim 1. As discussed in Applicants' December 20, 2007 Amendment and Response, the teaching of Bogart does not disclose, teach or suggest the use of polymers in a detection layer, but instead only discloses the use of various polymeric materials as an attachment layer suitable for binding an analyte receptive material to the disclosed devices of Bogart.

Consequently, even if the proposed combination of select portions of the teaching of Drewes with select portions of the teaching of Bogart is deemed proper, the proposed combination of the teaching of Drewes with the teaching of Bogart still fails to teach or suggest Applicants' claimed invention as embodied in claim 32. In particular, the proposed combination of the teaching of Drewes with the teaching of Bogart still fails to teach or suggest (1) a polymer-containing detection layer sandwiched between a reflective layer and a semi-reflective layer as recited in Applicants' independent claim 1, and (2) a detection layer comprising a polymer of intrinsic microporosity as recited in Applicants' independent claim 1.

For at least the reasons given above, it is respectfully submitted that the proposed combination of the teaching of Drewes with the teaching of Bogart fails to make obvious Applicants' claimed invention as embodied in dependent claim 32. Accordingly, withdrawal of

this rejection is respectfully requested.

Rejection of Previously Presented Claim 35 Under 35 U.S.C. §103(a) In View of Drewes and further in view of U.S. Patent No. 4,877,747 (Stewart)

Previously presented claim 35 was rejected under 35 U.S.C. §103(a) as being unpatentable in view of Drewes, and further in view of U.S. Patent No. 4,877,747 to Stewart (hereinafter “Stewart”). This rejection is respectfully traversed.

Dependent claim 35 depends from independent claim 1 and claim 34, and further recites that the sensor of claim 1 is in combination with a light source and a photo-detector.

The teaching of Stewart is directed to an optical assay methods and apparatus. The disclosed apparatus comprises a buffer medium 15 (e.g., magnesium fluoride), a metal film layer 17 over the buffer medium 15, and an organic layer 7 (e.g., an antigen for a specific antibody).

Like the teaching of Drewes, the teaching of Stewart fails to disclose, teach or suggest a colorimetric sensor comprising (i) a reflective layer, (ii) a detection layer over the reflective layer, the detection layer comprising at least one polymer component, and (iii) a semi-reflective layer over the detection layer as recited in independent claim 1.

Applicants respectfully submit that even if the proposed combination of the teaching of Drewes with the teaching of Stewart is deemed proper, the proposed combination of the teaching of Drewes with the teaching of Stewart still fails to teach or suggest Applicants’ claimed invention as embodied in claim 35. In particular, the proposed combination of the teaching of Drewes with the teaching of Stewart still fails to teach or suggest (1) a polymer-containing detection layer sandwiched between a reflective layer and a semi-reflective layer as recited in Applicants’ independent claim 1, and (2) a detection layer comprising a polymer of intrinsic microporosity as recited in Applicants’ independent claim 1.

For at least the reasons given above, it is respectfully submitted that the proposed combination of the teaching of Drewes with the teaching of Stewart fails to make obvious Applicants’ claimed invention as embodied in dependent claim 35. Accordingly, withdrawal of this rejection is respectfully requested.

III. Conclusion:

For at least the reasons given above, Applicants respectfully submit that claims 1-16, 19-35, 43 and 45-55 define patentable subject matter. Accordingly, Applicants respectfully request allowance of these claims.

No additional fees are believed due; however, the Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, to Deposit Account No. 503025.

Should Examiner Akram believe that anything further is necessary to place the application in better condition for allowance, Examiner Akram is respectfully requested to contact Applicants' representative at the telephone number listed below.

Respectfully submitted,  
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